Practitioner's Docket No.: 791_065 CON *PATENT*

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of: Hiroshi Nemoto and Kenshin Kitoh

Ser. No.: 09/997,604 Group Art Unit: 1745

Filed: November 29, 2001 Examiner: Susy N Tsang-Foster

Confirmation No.: 5235

For: LITHIUM SECONDARY BATTERY

I hereby certify that this correspondence is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 addressed to **Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450** on January 5, 2004 under "EXPRESS MAIL" mailing label number **EL 99443 5238 US.**

Janet M. Stevens

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
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REQUEST FOR RECONSIDERATION

Sir:

The following is in response to the Office Action mailed September 3, 2003.

Claims 10-23 remain pending herein.

Claims 12 and 19 were rejected under 35 USC 112, first paragraph.

The Office Action contains statements to the effect that although the specification discloses batteries in which the primary particles of the positive electrode active material *include* particles having at least one side of each flat crystal face of length of 1 μm or more, the specification does not provide support for a battery in which the primary particles of the positive electrode active material *all* have at least one side of each flat crystal face of length 1 μm or more. It is respectfully noted that claims 12 and 19 do not recite that *all* of the primary particles of the positive electrode active material have at least one side of each flat crystal face of length of 1 μm or more. Rather, claims 12 and 19 recite that the primary particles *consist essentially of* particles having at least one side of each flat crystal face of length of 1 μm or more, meaning that the primary particles of the positive electrode active material can include non-conforming particles (i.e., particles which do not have at least one side of each flat crystal face of length of 1 μm or more), so long as there are not so many of such non-conforming particles that the basic and novel characteristics of the present invention are materially affected. That is, as has been repeatedly and consistently held, the expression

"consisting essentially of" renders the claim open only for the inclusion of unspecified ingredients which do not materially affect the basic and novel characteristics of the claimed invention (e.g., *ex parte Davis and Tuukkanen*, 80 USPQ 448,450 (Pat. Ofc. Bd. App. 1948). Those basic and novel characteristics of the invention include significant reduction in internal resistance and good repeated cycle properties, as described throughout the present specification. Completely consistent with the above is the portion of the specification referred to in the Office Action where it is disclosed that the "positive electrode active material. . . is characterized by consisting of primary particles *mostly* having the above-mentioned morphology [emphasis added]."

The Office Action further contains a statement that the specification "states that the particle diameters of the primary particles are obtained by analysis of the SEM image and the particle diameter measurement for individual particles are impossible." This statement leaves out a critical portion of the statement in the specification to which it refers. In particular, the statement in the specification reads "[t]he particle diameters of the primary particles are expressed as particle diameters obtained by the analysis of SEM image because the separation of individual particles and the particle diameter measurement for individual particles are impossible." The complete statement in the specification clearly describes that particle diameters of the primary particles are expressed as particle diameters obtained by the analysis of SEM image, and that the reason particle diameters of the primary particles are expressed in this way is because the separation of individual particles is impossible. This statement in no way indicates that expression of particle diameters of the primary particles is impossible.

The Office Action further contains statements to the effect that the specification indicates that the amount of particles having particle diameters outside the specified ranges are at a level not ordinarily detected in the measurement methods described in the specification. As noted above, the recitation "consisting essentially of" does not require that *every* primary particle satisfy the recited feature, but rather that the amount (if any) of primary particles not satisfying the recited feature is not so large as to materially affect the basic and novel characteristics of the present invention.

In view of the above, it is respectfully requested that the U.S. Patent and Trademark Office reconsider and withdraw this rejection.

Claims 10-14 and 17-21 were rejected under 35 U.S.C.§102(b) or under 35 U.S.C.§103(a) over Japanese 8-217452 (JP '452).

The present invention is directed to a method of reducing internal resistance of a lithium secondary battery. The method comprises forming an electrode body which includes a positive electrode comprising positive electrode active material, the primary particles of which have a substantially octahedral shape constituted mainly by flat crystal faces, such primary particles including particles having at least one side of each flat crystal face of length of 1 μm or more.

JP '452 is directed to a *needle-like* particle shape manganese complex oxide. The statements in the Office Action overlook the express statements in JP '452 that the particles of JP '452 are *needle-like*. Attached to the September 3, 2003 Office Action was a paper entitled "Six-Fold Regular Octahedron", which shows that a regular octahedron has eight equilateral triangles as faces. The U.S. Patent and Trademark Office attempts to argue that a *needle-like* regular octahedron would have the same shape, i.e., that the expression "needle-like" does not carry with it any meaning at all. To the contrary, a regular octahedron needle-like particle consists of a pair of regular octahedral-shaped end regions having an extension portion therebetween, rendering the particle "needle-like." It is further noted that the expression "regular-octahedron needle-like" is far more descriptive of the shape to which it refers than is the expression "dodecahedral" (i.e., any shape having twelve surfaces).

The Office Action further contains a statement that "the positive electrode active material has the same particle shape, composition, and primary particle size as those disclose in the specification and being claimed in the instant claims . . . ".

The present specification discloses that production of the positive electrode active material of the present invention is conducted by firing a raw material mixture consisting of given proportions of salts and/or oxides of various elements in an oxidizing atmosphere at 700 to 900°C for five to fifty hours (original specification, page 11, lines 5-10). The specification further discloses that when the firing temperature is low, growth of particles hardly takes place, making it difficult to obtain a positive electrode active material constituted by primary particles having intended particle diameters and an intended shape, whereas when the firing temperature is high, large primary particles are formed but neck growth occurs between primary particles and each neck portion becomes rounded (original specification,

page 11, lines 11-17). Thus, the specification discloses, by selecting the composition of raw materials and the firing conditions appropriately, it is possible to control the average particle diameter of the primary particles obtained and the morphology of the primary particles (original specification, page 12, lines 3-6). For example, the specification discloses, in the positive electrode active material of comparative example 2, in which a positive electrode active material was obtained by weighing and mixing powders of Li_2CO_3, MnO_2 and B_2O_3 and then firing the resulting mixture in an oxidizing mixture at 800°C for twenty-four hours, striking particle growth was observed and the primary particles were roundish, and that primary particles having a substantially octahedral shape could be obtained by lowering the synthesis temperature and/or shortening the synthesis time in order to suppress the particle growth (original specification, page 12, lines 6-12 and page 14, lines 10-14). In other words, even within the broad description of the process set forth in the present specification, page 11, lines 5-10, obtaining the properties recited in the present claims is clearly not inherent. With the guidance provided in the present specification (e.g., page 12, lines 9-12), persons of skill in the art are provided with the information needed in order to be readily able to produce positive active material which does satisfy the parameters recited in the claims by appropriate selection of raw materials and firing conditions within the scope of the process described in page 11, lines 5-10, without having to engage in an undue amount of experimentation. Without the guidance provided by the present specification or the subject matter recited in the present claims, persons of skill in the art would have no reason to attempt to make selections from within the broad disclosure in JP '452 so as to arrive at a battery having a positive electrode comprising positive electrode active material which satisfies the features recited in the present claims. In fact, JP '452 instead motivates persons of skill in the art to attempt to select process conditions and raw materials so as to obtain *regular octahedron needle-like* particles which are then used as a positive electrode active substance.

In view of the of the above, it is respectfully requested that the U.S. Patent and Trademark Office reconsider and withdraw this rejection.

Claims 10-14 and 17-21 were rejected under 35 U.S.C.§102(b) or under 35 U.S.C.§103(a) over U.S. Patent No. 5,631,104 (Zhong '104).

As discussed above, and as demonstrated in the Example and Comparative Examples in the present specification, processing positive electrode active material in the manner

described in the present specification, page 11, lines 5-10, does not inherently result in production of positive electrode active material having the characteristics recited in the present claims. The specification includes description of an Example in accordance with the present invention, in which a positive electrode active material was produced which consisted of primary particles having a substantially octahedral shape. The procedures described in Zhong '104 clearly differ from the method used in the Example. There is clearly no basis for the statements in the Office Action to the effect that Zhong '104 discloses identical synthesis conditions and formulas as those of the present applicant, or that the properties recited in the present claims would be inherent (such inherency is clearly disproved by the Comparative Examples reported in the present specification).

Moreover , the process conditions employed in Comparative Examples 1 and 2 were identical to those employed in the Example (differing starting materials were employed) and the Comparative Examples *did not* achieve primary particles having substantially octahedral shape, whereas the Example *did* achieve such primary particles. Accordingly, the Comparative Examples reported in the present specification are closer to the present invention than are the various disclosures in Zhong '104, thereby further disproving the notion of inherency advanced in the Office Action.

In view of the above, it is respectfully requested that the U.S. Patent and Trademark Office reconsider and withdraw this rejection.

Claims 10-14 and 17-21 were rejected under 35 U.S.C.§102(e) or 35 U.S.C.§103(a) over U.S. Patent No. 5,961,949 (Manev '949).

Again, as discussed above, and as demonstrated in the Example and Comparative Examples in the present specification, processing positive electrode active material in the manner described in the present specification, page 11, lines 5-10, does not inherently result in production of positive electrode active material having the characteristics recited in the present claims. As noted above, the specification includes description of an Example in accordance with the present invention, in which a positive electrode active material was produced which consisted of primary particles having a substantially octahedral shape. The procedures described in Manev '949 clearly differ from the method used in the Example. There is clearly no basis for the statements in the Office Action to the effect that Manev '949 discloses identical synthesis condition and formulas as those of the present applicant, or that

the properties recited in the present claims would be inherent (such inherency is clearly disproved by the Comparative Examples reported in the present specification).

Moreover, as noted above, the Comparative Examples reported in the present specification (in which primary particles having substantially octahedral shape *were not* obtained) are closer to the present invention than are the various disclosures in Manev '949, thereby further disproving the notion of inherency advanced in the Office Action.

Claims 15, 16, 22 and 23 were rejected under 35 U.S.C.§103(a) over each of JP '452, Zhong '104 and Manev '949, each in view of U.S. Patent No. 5,700,597 (Zhong '597).

In each rejection, Zhong '597 is relied on in the Office Action for alleged disclosure of high energy density. Accordingly, any such disclosure in Zhong '597 would not overcome the shortcomings of the respective primary references as attempted to be applied against claims 10 and 17, from which each of claims 15, 16, 22 and 23 ultimately depend.

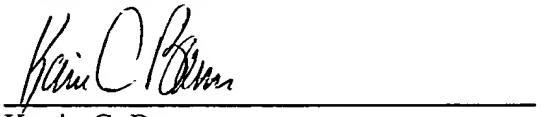
It is therefore respectfully requested that the U.S. Patent and Trademark Office reconsider and withdraw these rejections.

In view of the above, claims 10-23 are in condition for allowance.

If the Examiner believes that contact with Applicants' attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicants' attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,



January 5, 2004
Date

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PATENT AMENDMENT TRANSMITTAL

(Provisions of 37 CFR 1.136 Apply)

RECEIVED JAN 07 2004 TC 1700

Application Number	09/997,604	Filing Date	November 29, 2001
Group Art Unit	1745	Examiner Name	Susy N Tsang-Foster
Confirmation No.	5235	Attorney Docket No.	791_065 CON
Inventor(s)	Hiroshi Nemoto and Kenshin Kitoh		
Invention:	LITHIUM SECONDARY BATTERY		

Transmitted herewith is an Amendment in the above-identified application. The fee has been calculated as follows:

CLAIMS AS AMENDED

(1)	(2) Claims Remaining After Amendment	(3)	(4) Highest Number Previously Paid	(5) No. of Extra Claims Present	(6) Rate (Large Entity)	(7) Additional Fee
TOTAL CLAIMS	14	MINUS	20	0	$18.00	$00.00
INDEP. CLAIMS	2	MINUS	3	0	$86.00	$00.00
				TOTAL ADDITIONAL FEE FOR THIS AMENDMENT		$00.00

EXTENSION OF TERM

☐ Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition for extension of time.

☒ This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application. The requested extension and appropriate non-small entity fee are as follows:

☒ One Month (37 CFR 1.17(a)(1) $110.00	110.00
☐ Two Month (37 CFR 1.17(a)(2) $420.00	
☐ Three Month (37 CFR 1.17(a)(3) $950.00	
TOTAL FEES DUE	
☐ Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee amount is reduced by one-half, and the resulting fee is:	

FEE PAYMENT

☐ No additional fee is required.
☒ A check in the amount of $110.00 is enclosed.
☐ Charge Deposit Account 50-1446 in the amount of $. Enclosed is a duplicate copy of this sheet.
☒ Please charge any fees which may be required, or credit any overpayment, to Deposit Account 50-1446.

Submitted By:

Name *(Print Type)*	Kevin C. Brown	Reg. No.	32,402	Customer No.	025191
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Signature	Kevin C Brown			Date	January 5, 2004

EXPRESS MAIL CERTIFICATE

"Express Mail" label number EL 99443 5238 US — Date of Deposit: January 5, 2004

I hereby certify that this correspondence is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR § 1.10 on the date indicated above and is addressed to **Mail Stop AF, Commissioner for Patents**, P.O. Box 1450, Alexandria, VA 22313-1450.

Janet M. Stevens

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